



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

AS

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,106	02/01/2001	Gerard A. Mourou	UMJ-939-R	4544

7590 04/24/2003

Linda M. Deschere
Harness Dickey & Pierce P.L.C.
5445 Corporate Drive
Suite 400
Troy, MI 48098-2683

EXAMINER

EVANS, GEOFFREY S

ART UNIT

PAPER NUMBER

1725

DATE MAILED: 04/24/2003

19

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/775,106	MOUROU ET AL.
	Examiner	Art Unit
	Geoffrey S Evans	1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 20 November 2002.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 46-80 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 46-80 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>14</u> .	6) <input type="checkbox"/> Other: _____

DETAILED ACTION

1. The first sentence of the specification should be amended to refer to all of the other reissue applications in accordance with 37 CFR 1.777(a). Please note that no mention is currently made of copending application No. 09/775,069. Applicant's attempted amendment to the specification in the amendment of November 20,2002 was not entered because it is not in compliance with 37 CFR 1.173(b)(1) which recites in part "Changes to the specification, other than to the claims, must be made by submission of the entire text of an added or rewritten paragraph, including markings". Please note that there is already a paragraph at the beginning of the specification referring to 09/366,685 (which should be updated as it is now RE 37,585 E).
2. Receipt is acknowledged of a statement in this file (see page 7 of the amendment of November 20,2002) that U.S. Patent Number 5,656,186 was previously surrendered in application No. 09/366,685.
3. The terminal disclaimer of January 29,2003, paper number 17 is proper and has been recorded.
4. In accordance with 37 CFR 1.175(b)(1), a supplemental reissue oath/declaration under 37 CFR 1.175(b)(1) must be received before this reissue application can be allowed.

Claims 46-80 are rejected as being based upon a defective reissue declaration under 35 U.S.C. 251. See 37 CFR 1.175. The nature of the defect is set forth above.

Receipt of an appropriate supplemental oath/declaration under 37 CFR 1.175(b)(1) will overcome this rejection under 35 U.S.C. 251. An example of acceptable language to be used in the supplemental oath/declaration is as follows:

"Every error in the patent which was corrected in the present reissue application, and is not covered by a prior oath/declaration submitted in this application, arose without any deceptive intention on the part of the applicant."

5. Claim 52 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support in U.S. Patent No. 5,656,186 that the material being machined is a semiconductor. Applicant cannot successfully argue that Applicant by contemplating the genus of all materials for the process entitles Applicant to now claim the species of semiconductors for use in the process. See Ex Parte Klager, 132 USPQ 206, 207 " ... as a matter of law, an applicant cannot include and claim a specific thing not originally described, merely because it comes within the scope of the genus before disclosed."

6. Applicant's declarations under 37 CFR 1.131 have overcome the Kautek et al. article as a reference.

7. Applicant's arguments regarding the rejection based upon 35 U.S.C. 251 as being an improper recapture of broadened claimed subject matter is persuasive.

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

9. Claims 46,48,49,50,51/46,51/48,51/49,51/50,52/46,52/48,52/49,52/50, 55/46, 55/48, 55/49, 55/50, 57/46,57/48,57/49,57/50,58/46, 58/48,58/49,58/50, 61/56/46, 61/56/48,61/56/49,61/56/50, 62/55/46,62/55/48,62/55/49, 62/55/50, 63/46,63/48, 63/49, 63/50,69/46,69/48,69/49,69/50,70/46,70/48,70/49,70/50, 71/46,71/48,71/49,71/50, 72/46,72/48,72/49,72/50,73/46,73/48,73/49,73/50, and 78 are rejected under 35 U.S.C. 102(b) as being anticipated by Ihlemann et al. in the article "Nanosecond and Femtosecond Excimer Laser Ablation of Fused Silica". Ihlemann et al. discloses as shown in figure 1 laser ablation of a transparent dielectric material (SiO₂) by making holes with pulses of 500 femtoseconds duration, which is far less than a pulse width of 10 picoseconds which is disclosed as the point at which the machining is essentially accurate with this material. Since Ihlemann et al. discloses pulse width shorter than 10 picoseconds inherently under Applicant's discovered law of nature (the log-log

relationship between fluence threshold at which breakdown occurs versus laser pulse width, the relationship exhibiting a distinct change in slope with respect to decreasing pulse width to a nearly constant value) the laser pulse ablation of Ihlemann et al. must also be subject to the same law of nature. See EMI Group North America Inc. v. Cypress Semiconductor Corp., 60 USPQ 1423,1430 (CAFC 2001) which states "Recitation of a law of nature does not distinguish a claim from prior art. Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127,130 (1948) ("[M]anifestations of laws of nature [are] free to all men and reserved exclusively to none. He who discovers a hitherto unknown phenomenon of nature has no claim to monopoly of it which the law recognizes."). Similarly, Ihlemann et al.'s pulse width must be below the pulse width at which the laser induced breakdown becomes essentially accurate and the point at which the size of the feature is not limited by thermal diffusion and the pulse width of Ihlemann et al. is sufficiently short that the affected area is substantially determined solely by the beam shape and fluence in relation to the threshold for laser induced breakdown.

10. Claims 46,48-50,51/46,51/48,51/49,51/50,52/46,52/48, 52/49, 52/50, 55/46,55/48,55/49,55/50, 57/46,57/48,57/49, 57/50, 58/57/46, 58/57/48,58/57/49, 58/57/50,62/46,62/48,62/49,62/50, 63/46,63/48,63/49,63/50, 65/46,65/48,65/49,65/50, 68/46,68/48,68/49,68/50, 69/46,69/48,69/49,69/50,70/46,70/48,70/49,70/50, 71/46, 71/48,71/49,71/50, 72/46,72/48,72/49,72/50, 73/46,73/48,73/49,73/50 and 78 are rejected under 35 U.S.C. 102(e) as being anticipated by Alexander in U.S. Patent No. 6,489,589 B1. The Alexander reference, which has an effective filing date of February

7,1994, discloses (see column 9, line 63 to column 10, line 38) laser machining stainless steel, gold, copper, iron, nickel, titanium, silicon, and diamond (which is a transparent material) using pulses with a width of 150 femtoseconds duration, which is far less than a pulse width of 10 picoseconds which is disclosed by the instant application as the point at which machining is essentially accurate with this material. Since Alexander discloses a pulse width shorter than 10 picoseconds inherently under Applicant's discovered law of nature (the log-log relationship between fluence threshold at which breakdown occurs versus laser pulse width, the relationship exhibiting a distinct change in slope with respect to decreasing pulse width to a nearly constant value) the laser pulse ablation of Alexander must also be subject to the same law of nature. See EMI Group North America Inc. v. Cypress Semiconductor Corp., 60 USPQ 1423, 1430 (CAFC 2001) which states "Recitation of a law of nature does not distinguish a claim from prior art. Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948) ("[M]anifestations of laws of nature [are] free to all men and reserved exclusively to none. He who discovers a hitherto unknown phenomenon of nature has no claim to monopoly of it which the law recognizes."). Similarly, Alexander's pulse width must be below the pulse width at which the laser induced breakdown becomes essentially accurate and the point at which the size of the feature is not limited by thermal diffusion and the pulse width of Ihlemann et al. is sufficiently short that the affected area is substantially determined solely by the beam shape and fluence in relation to the threshold for laser induced breakdown.

Art Unit: 1725

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 47, 51/47,52/47,55/47,56,59,60,61,58/47,62/55/47, 63/47,65/47,66/47, 69/47, 70/47,71/47,72/47,73/47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ihlemann et al. in view of Lai in U.S. Patent No. 5,984,916. Ihlemann et al. discloses as shown in figure 1 laser ablation of a transparent material (SiO₂) by making holes with pulses of 500 femtoseconds duration. Lai as shown in figure 5 teaches creating an interaction zone that is smaller than the wavelength of the laser beam beneath the surface of the workpiece. It would have been obvious to adapt

Ihlemann et al. in view of Lai to provide this to decrease the size of the part of the workpiece that has material properties change.

14. Claims 64/46,64/48,64/49, and 64/50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ihlemann et al. in view of Mourou et al. in U.S. Patent No. 5,235,606. Mourou et al. teaches generating a short optical pulse by stretching the pulse in time, amplifying the pulse, and recompressing the amplified pulse. It would have been obvious to adapt Ihlemann et al. in view of Mourou et al. to provide this to create a short high peak power pulse.

15. Claim 64/47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ihlemann et al. in view of Lai in U.S. Patent No. 5,984,916 as applied to claim 47 above, and further in view of Mourou et al. in U.S. Patent No. 5,235,606. Mourou et al. teaches generating a short optical pulse by stretching the pulse in time, amplifying the pulse, and recompressing the amplified pulse. It would have been obvious to adapt Ihlemann et al. in view of Lai and Mourou et al. to provide this to create a short high peak power pulse.

16. Claims 65/46,65/48,65/49,65/50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ihlemann et al. in view of Stuke et al. in U.S. Patent No. 5,243,589. Stuke et al. teaches machining with femtosecond laser pulses by scanning a laser beam relative to a workpiece by moving the workpiece (e.g. see column 2,lines 35-37). It would have been obvious to adapt Ihlemann et al. in view of Stuke et al. to form a groove or textured surface along the workpiece surface.

17. Claims 47,51/47,52/47,55/47,56,57/47,57/47,58/47,59,60,61,62/47,63/47, 65/47, 66, 68/47,69/47,70/47, 71/47, 72/47,73/47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander in U.S. Patent No. 6,489,589 B1 in view of Lai in U.S. Patent No. 5,984,916. Lai as shown in figure 5 teaches creating an interaction zone that is smaller than the wavelength of the laser beam beneath the surface of the workpiece. It would have been obvious to adapt Alexander in view of Lai et al. to provide this to decrease the size of the part of the workpiece that has material properties change.

18. Claims 64/46,64/48,64/49, and 64/50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander in view of Mourou et al. in U.S. Patent No. 5,235,606. Mourou et al. teaches generating a short optical pulse by stretching the pulse in time, amplifying the pulse, and recompressing the amplified pulse. It would have been obvious to adapt Alexander in view of Mourou et al. to provide this to create a short high peak power pulse.

19. Claim 64/47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander in view of Lai as applied to claim 47 above, and further in view of Mourou et al. in U.S. Patent No. 5,235,606. Mourou et al. teaches generating a short optical pulse by stretching the pulse in time, amplifying the pulse, and recompressing the amplified pulse. It would have been obvious to adapt Alexander in view of Lai et al. and Mourou et al. to provide this to create a short high peak power pulse.

20. Claims 53/52/46,53/52/48,53/53/49,53/52/50, 54/53/52/46, 54/53/52/48, 54/53/52/49, 54/53/52/50,79 and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander in view of Wojnarowski et al. in U.S. Patent No. 5,104,480. Wojnarowski et al. teaches laser machining gold (see column 7,line 19) above a substrate of glass (see column 6,line 64) to create a conductive pattern for an integrated circuit. It would have been obvious to adapt Alexander in view of Wojnarowski et al. to provide this to create an integrated circuit on the substrate.

21. Claims 53/52/47, 54/53/52/47,68/47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander in view of Lai in U.S. Patent No. 5,984,916 as applied to claim 47 above, and further in view of Wojnarowski et al. in U.S. Patent No. 5,104,480. Wojnarowski et al. teaches laser machining gold (see column 7,line 19) above a substrate of glass (see column 6,line 64) to create a conductive pattern for an integrated circuit. It would have been obvious to adapt Alexander in view of Lai et al. and Wojnarowski et al. to provide this to create an integrated circuit on the substrate.

22. Claims 67 and 74-77 patentably define over the art of record but are rejected under 35 U.S.C. 251 as stated above.

23. Applicant's arguments filed November 20,2002 have been fully considered but they are not persuasive. Applicant argues that Ihlemann et al. does not have pulses "characterized by a pulse width with a relationship of fluence breakdown threshold versus laser pulse width having a distinct change in slope". But the relationship between fluence breakdown threshold and pulse width is a law of nature which depends upon the particular material. See EMI Group North America Inc. v. Cypress

Semiconductor Corp., 60 USPQ 1423,1430 (CAFC 2001) which states "Recitation of a law of nature does not distinguish a claim from prior art. Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127,130 (1948) ("[M]anifestations of laws of nature [are] free to all men and reserved exclusively to none. He who discovers a hitherto unknown phenomenon of nature has no claim to monopoly of it which the law recognizes.""). Applicant's own specification discloses (see e.g. figures 7 and 8 and related specification) using a laser pulse width of 300 fs (i.e. 0.3 picoseconds) has a pulse width that is less than the pulse width that is characterized by "a relationship of fluence breakdown threshold versus laser pulse width having a distinct change in slope". Since Ihlemann et al.'s pulse width of 500 fs (i.e. 0.5 picoseconds) is also less than the pulse width that is characterized by "a relationship of fluence breakdown threshold versus laser pulse width having a distinct change in slope" (as shown by the graph in Applicant's figure 8) it also meets this limitation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey S Evans whose telephone number is (703)-308-1653. The examiner can normally be reached on Mon-Fri 6:30AM to 4:00 PM, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (703)-308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are (703)-872-9310 for regular communications and (703)-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0661.



Geoffrey S Evans
Primary Examiner
Art Unit 1725

GSE
March 7, 2003